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ABSTRACT

Economic theory suggests that when the reduction in earnings from dropping out of school is minimal, dropout rates will be high. As earnings loss for dropouts grows, however, the dropout rate should decrease. This chapter examines whether these predicted effects actually occur by looking at changes in dropout rates in Kentucky in the 1970s and 1980s. Following the 1973 Organization of Petroleum Exporting Countries oil embargo, the rising price of coal had a major impact on Kentucky's economy, greatly increasing employment and earnings in counties with large coal reserves. Unfortunately for Kentucky, the coal bust that followed in the 1980s was equally sharp. Data for 1972-81 from Pike County--the largest coal producing county in eastern Kentucky--show that changes in population and changes in enrollment in grades 5-8 were somewhat parallel, but that change in high school enrollment almost always moved in the opposite direction of change in population. In addition, analysis of regional earnings and enrollment data suggests that a 10 percent increase in earnings between 1969 and 1993 reduced high school enrollments by about 2.5 percent. Thus, high school enrollments seem fairly sensitive to the opportunities for unschooled workers in the surrounding area. Data on relative earnings for Kentucky males at different education levels in 1980 and 1990 suggest that incentives to attend college increased in the 1980s, but not the incentive to complete high school. Implications for Kentucky's future and for the Kentucky Education Reform Act are discussed. (SV)

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ED 438 121

The Earnings of Dropouts and High School Enrollments: Evidence from the Coal Boom and Bust

The coal boom of the 1970s may have had an unanticipated outcome in Pike County, creating high-wage, relatively low-skill jobs in the local economy that effectively rewarded dropping out of high school. The implications are significant for an economy that has continued to produce incentives for college graduation, while providing little incentive to complete high school. These findings underscore the importance of linking economic reward to academic achievement. Earnings opportunities for high school graduates can be improved through better academic preparation for the workplace of today.

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Economic theory suggests that when students make the decision to drop out of high school they consider how their decision will affect their earnings. Thus, economists would expect that, if the reduction in earnings from dropping out of school is minimal, dropout rates will be high. As the loss of earnings for dropouts grows, however, the dropout rate should decrease. This paper summarizes an attempt to see if these predicted effects actually occur by looking at changes observed in dropout rates in some areas of Kentucky in the 1970s and 1980s.

The 1973 OPEC oil embargo caused a huge increase in the price of coal which, in turn, greatly expanded the demand for workers in the coal industry. Because many of the jobs in the coal industry require little in the way of formal schooling, this sudden change greatly affected the relative earnings of high school graduates and dropouts in a very short time.

Due to the oil embargo, Kentucky areas with coal experienced rising employment and earnings while other areas within relatively short distances suffered the declines in economic activity experienced by the overall economy as energy prices soared. As the oil prices declined, the demand for coal also declined, causing a subsequent bust in the coal market in the 1980s. This reversed the gains in employment and earnings experienced in the coal-producing regions during the 1970s.

The increases in coal prices in the 1970s were large by any standard. The real price of coal increased 44 percent between July 1973 and July 1974, and then remained relatively stable until about 1978, when it began a gradual decline through the 1980s and 1990s. The large upswing in coal prices had a major impact on Kentucky's economy. In 1972, mining earnings accounted for only 4.2 percent of the earnings of all Kentuckians, but by 1980 mining accounted for 9.4 percent of earnings. The economic benefits of the coal boom, however, were not spread evenly across the Commonwealth. Only 52 of Kentucky's 120 counties have coal reserves and, among those with reserves, there is great variation in the amount. Unfortunately for Kentucky, the coal bust that followed was equally sharp. Between 1982 and 1992, there was an 82 percent reduction in the number of coal miners in Kentucky.[1]

[1] Kentucky Coal Marketing and Export Council, Cabinet for Economic Development, and Kentucky Coal Association. *Kentucky Coal Facts 1993.*

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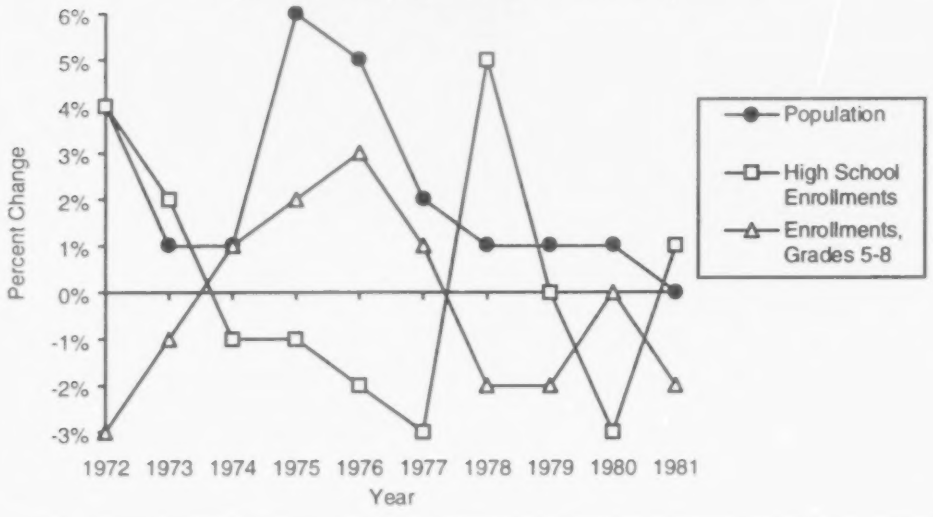
FIGURE 9.1
Change in Pike County Enrollments and Population



As earnings in the coal industry fluctuated, so did high school enrollments in counties providing mining labor. Figure 9.1 provides a clearer view of the impact of the coal boom on high school enrollments. It depicts the rates of change between 1972 and 1982 in high school enrollments, enrollments in grades 5 through 8, and in population, for Pike County, Kentucky. Pike County is the largest coal-producing county in eastern Kentucky, with a population of 72.5 thousand people in the 1990 Census. Two features of the graph stand out. First, the change in population and the change in pre-high school enrollment track one another reasonably well. Second, the change in high school enrollments almost always moves in the opposite direction of changes in population: As population increased, high school enrollments decreased, and vise versa. This strongly suggests more and more students were not completing high school during the coal boom, but were dropping out to take jobs in the coal, and other industries, that were expanding at the time. The coal industry does not generally require its workers to have much formal schooling. As a result, the coal shock increased the earnings of high school dropouts relative to high school graduates, which caused a decline in high school enrollments.

Further evidence comes from estimating the effect of changes in earnings on changes in high school enrollment. Changes in earnings were estimated using data from the Bureau of Economic Analysis' (BEA) Regional Economic Information System for 1969 through 1993. Enrollment data was taken from various sources within the Department of Education. The estimate made with this data indicates that a 10 percent increase in earnings within a county reduces high school enrollments by about 2.5 percent. Thus, high school enrollments seem fairly sensitive to the opportunities for unschooled workers in the surrounding area.

If the coal boom reduced the incentive for some students to finish high school, then the coal bust in the 1980s should have increased the incentive to finish. Data from the Current Population Survey shows that, during the 1980s, there was a fundamental shift in the distribution of earnings in the United States. Workers who had relatively more education received much higher real wages, while workers with relatively little education saw large reductions in their real wages. It seems reasonable to expect that the large change in relative earnings affected the incentives students had to attend school.

TABLE 9.1
Relative Earnings of Kentucky Males Aged 25 to 55
Current Population Surveys, 1980 and 1990

	1980	1990
Earnings of those who did not attend high school relative to high school graduate	-27.8 %	-33.8 %
Earnings of high school dropouts relative to high school graduated	-17.3	-15.9
Earnings of those who attended, but did not graduate, from college relative to high school graduates	14.6	12.3
Earnings of college graduates relative to high school graduates	32.2	59.5
Earnings of graduate degree recipients relative to high school graduates	22.5	63.7

Notes: Data from the National Bureau of Economic Research's outgoing rotation CD. Estimates are from a regression that includes controls for race, marital status, potential experience, and time of interview. There are 1800 observations.

Estimates for Kentucky males between the ages of 25 and 55, given in the first column of Table 9.1, indicate that, in 1980, high school dropouts earned about 17 percent less than those who completed high school. Those who completed college earned about 32 percent more than high school graduates. The results for 1990, in the second column of Table 9.1, show a remarkable change. By 1990, those who completed college earned nearly 60 percent more than those who completed high school. Thus, Kentucky seems to have exhibited much the same patterns of earnings as the United States as a whole.

The results in Table 9.1 also indicate that wages of dropouts relative to high school graduates did not change much over the decade. While in 1980 dropouts earned 17 percent less than those who completed high school, they earned only 16 percent less than high school graduates in 1990, although this difference is not statistically significant. Thus, the 1980s provided little change in the incentive to complete high school. The wages of high school graduates declined in the 1970s and 1980s while the earnings of college graduates have increased.[2] Thus, the incentives to attend college have increased, but not the incentive to complete high school.

Implications for the Future

The change in relative earnings during the 1980s appears to be continuing in the 1990s. Many of the jobs in the past, such as farming and mining, required little in the way of formal education. As Kentucky's economy changes, however, its labor market is reacting. Several industries are growing as we move from our traditional agricultural economy, to one more concentrated in manufacturing and service. Jobs in the manufacturing and service industries generally require more formal education. Growth in these industries increases the returns to finishing high school and to pursuing higher education. As employers demand workers with greater skills, Kentucky should see reductions in the dropout rate. In addition, more students will pursue higher education. The Bureau of Economic Analysis estimates past—and projects future—employment and earnings by industry. These estimates appear in Tables 9.2 and 9.3. As the estimates show, the structure of Kentucky's economy and, therefore, the needs of its employers, are changing.

[2] See Katz, L.F., Murphy, K.M. (1992, February). Changes in relative wages 1963-1987: Supply and demand factors. *Quarterly Journal of Economics, 107,* 35-78.

TABLE 9.2
Number of Jobs by Industry in Kentucky (in Thousands)

	1989	1990	1991	1992	1993	1998	2000	2005
Farm	127	125	119	122	119	118	117	115
Agricultural Services	17	19	19	19	19	23	24	27
Coal Mining	31	32	29	26	25	-	19	17
Other Mining	8	8	7	7	7	27	7	6
Construction	99	101	99	106	110	119	120	125
Manufacturing	291	295	289	293	303	312	314	217
Transport & Utilities	91	96	97	97	100	107	109	115
Wholesale & Retail	397	404	405	415	427	462	469	491
F.I.R.E.	95	97	98	97	98	103	107	111
Services	410	436	447	463	481	546	571	625
Government	298	301	306	317	316	331	335	345
All-Industry Total	1863	1913	1916	1961	2003	2146	2191	2295

Note: The numbers above represent the number of full and part time jobs rather than the number of people. An individual who works two jobs will be counted for each job.
Source: Bureau of Economic Analysis Regional Projections to 2045: Volume 1, States.

TABLE 9.3
Average Annual Earnings by Industry in Kentucky (in Dollars)

	1989	1990	1991	1992	1993	1998	2000	2005
Farm	7,372	7,022	7,363	8,342	7,483	8,403	9,142	9,852
Agricultural Services	10,706	10,389	10,591	10,765	10,764	11,342	11,496	12,074
Coal Mining	38,684	38,491	38,425	39,307	39,130	-	-	-
Other Mining	33,655	33,736	33,374	34,307	34,112	36,018	35,969	37,303
Construction	18,914	18,300	17,412	17,359	17,642	18 352	18,483	18,934
Manufacturing	25,646	25,600	25,212	26,098	25,743	27,231	27,500	28,798
Transport & Utilities	25,404	24,981	25,126	26,056	25,721	26,212	26,126	26,660
Wholesale & Retail	12,978	12,759	12,757	12,891	12,861	13,220	13,253	13,515
F.I.R.E.	15,435	15,260	15,081	16,601	17,503	18,885	19,731	21,194
Services	15,431	15,283	15,341	15,847	15,192	16,687	17,066	17,862
Government	18,873	19,026	19,567	19.934	19,777	20,558	20,905	21,635
Average Annual Earnings for State	17,510	17,360	17,339	17,834	17,754	18,476	18,725	19,400

Note: The numbers above represent the number of full and part time jobs rather than the number of people. An individual who works two jobs will be counted for each job.
Source: Bureau of Economic Analysis Regional Projections to 2045: Volume 1, States.

Mining has traditionally been a high paying industry in Kentucky. In 1993, coal miners were paid an average of $39,000 per year. Over the past few years, however, both wages and employment in the mining sector have decreased. This trend is expected to continue into the future, assuming no shocks to the economy occur that would raise the price of coal.

From 1989 to 1993, services and wholesale and retail trade have shown relatively large growth in employment. Annual earnings in these sectors have seen little growth over the same time period. While little growth is expected in earnings per employee, the number of workers employed in these industries are expected to continue to grow. Currently, services account for approximately 24 percent of the jobs in Kentucky. It is projected that the service sector will grow to account for 26 percent of Kentucky jobs by the year 2000.

Manufacturing accounts for approximately 15 percent of Kentucky jobs. Projections show that growth in manufacturing should be enough to maintain its share of Kentucky jobs. Manufacturing jobs are relatively high paying jobs, averaging just under $26,000 per year.

Other industries, such as construction, transportation, utilities, and finance, will continue to show moderate growth. Farm employment has fluctuated in past years with a general downward trend that is likely to continue into the future.

Earnings available in the job market appear to play a significant role in determining the amount of education people desire. Historically, when coal jobs paid high wages, many students in the local area dropped out of school. The benefits to graduation were not high enough to keep those students in school. The Kentucky economy, however, appears to be moving to industries and jobs that require higher levels of education. As these jobs comprise a larger share of available employment opportunities, students will find greater rewards from educational attainment.

Conclusions

Obviously, most policymakers would prefer students to stay in school. Analysis suggests that the earnings of high school graduates relative to high school dropouts are of fundamental importance in determining the student's decision about whether to drop out. With the coal boom of the 1970s, as increased value of coal increased the wages of coal miners and mining jobs were plentiful, there was a reduction in the number of students enrolling in high school in the regions with coal to mine. As the coal industry then did not generally require workers with much formal schooling, these higher wages provided an incentive to drop out of high school. This reduction in high school enrollments occurred despite rapid population growth in the areas of Kentucky with coal reserves.

In 1990, Kentucky began a major education reform initiative: The Kentucky Educational Reform Act (KERA). The analysis has two important, but related, implications for KERA. First, it is important to recognize that general economic conditions affect the decision to complete high school. Thus, KERA could be remarkably successful, but high school enrollments could decline if the earnings opportunities for high school graduates continue to decline as they have since the middle of the 1970s. Second, if KERA is going to succeed in reducing the number of dropouts in Kentucky, it is important that there be an improvement in the skills of high school students not attending college. As employment opportunities change, the Kentucky secondary school system must provide high school graduates with the skills future employers will require.

References

Black, D., Daniel, K., Sanders, S. (1996). *Does economic growth help the poor?* mimeo.

U.S. Bureau of the Census. *Census of the Population: 1970.* General Social and Economics Characteristics Final Report PC(1)-C19 Kentucky.